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# NATIONAL SCHOOL TRANSPORTATION SPECIFICATIONS AND PROCEDURES



# 75 Years

May 2015

Adopted by the 16th National Congress on School Transportation



# **NATIONAL SCHOOL TRANSPORTATION SPECIFICATIONS and PROCEDURES**

**2015 REVISED EDITION**

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## FOREWORD

As the 16th National Congress on School Transportation (NCST) recently reached the milestone of being in existence for over 75 years, we look back to the origins of pupil transportation. In the first document produced in 1939, the importance of pupil transportation was identified as follows:

*“The safe and economical transportation of nearly 4,000,000 children to and from school every day of the school year is a matter of first importance to millions of parents and thousands of school board members in all parts of the nation. In 1938, [there were] 86,099 school buses in operation.”*

Today, 76 years later, the pupil transportation industry is providing safe, effective, efficient and healthy transportation for more than 25 million school children who ride more than 480,000 school buses each day. In addition, millions of school children ride school buses to and from activities and field trips each year.

Pupil transportation services provide a great reduction in transportation costs, a great reduction in traffic congestion and pollution, and access to education for countless students. These services continue to provide the safest way to and from school.

The 2015 National Congress on School Transportation was the latest in a series beginning in 1939 and continuing in 1945, 1948, 1951, 1954, 1959, 1964, 1970, 1980, 1985, 1990, 1995, 2000, 2005 and 2010. All congresses (referred to as “conferences” before 2005) have been made up of official representatives of state departments of education, public safety, motor vehicles, and police or other state agencies having state-wide responsibilities for the administration of student transportation; local school district personnel; contract operators; advisors from industry and representatives from other interested professional organizations and groups. Each conference has resulted in one or more publications that contain the recommendations of the respective conference.

The recommendations of specifications and procedures for school buses and their operation has been a major purpose of all conferences. The 1939 Conference was called for this sole purpose and formulated a set of recommended standards for school buses of 20 or more passengers. The 1945 Conference revised the 1939 recommendations and added standards for small vehicles with capacities of 10 to 18 passengers. Both standards were further revised by the 1948 Conference. There were additional revisions in 1959, and the 1964 Conference added standards for school buses to be used in transporting students with disabilities. In addition to revising standards for larger vehicles, the 1970 Conference refined the standards for school buses designed to transport fewer than 24 passengers.

Other major issues in student transportation have received attention at these national conferences. On several occasions, recommendations concerned primarily with other vehicles overtaking and passing school buses were transmitted to the National Committee on Uniform Traffic Laws and Ordinances for consideration in connection with revisions of the Uniform Vehicle Code. The 1948 Conference made recommendations on uniform records and reports for student transportation. The major purpose of the 1948 Conference was the formulation of recommendations related to

The 2000 Conference included significant discussion of the purpose and intended use of the document, which had been known in previous conferences as the *National Standards for School Transportation*. Leading up to the 2000 Conference, arguments were made for retention in the title of the term *Standards* or adoption of the new term *Guidelines*. These deliberations were an attempt to accurately describe the document to state and local transportation providers, industry suppliers, governmental oversight agencies, representatives of the legal profession and other users. The new title approved by the delegates was the *National School Transportation Specifications and Procedures*. A significant majority of the delegates believed that title described the actual contents and intended use of the document more precisely. The Introduction was expanded to explain clearly that the *National School Transportation Specifications and Procedures* comprises recommendations of the delegates to the states and other potential users of the document. It also clarified that these entities may choose, under their respective regulatory authorities, to adopt all, part or none of the specifications and procedures into laws or regulations, as they deemed appropriate.

Other significant changes or additions adopted by the 2000 Conference delegates included a new side-intrusion test for school bus bodies, a strong recommendation to states to require the use of school buses or buses having equivalent crash protection for all student transportation, reorganization of the operations sections into a more user-friendly format, sanctioning of the recent federal guidelines for seating of pre-school age students, conformance of the procedures for transportation of students with disabilities with updated federal regulations, and a new section on school bus inspection.

In 2005, the delegates changed the name of the conference to the National Congress on School Transportation to describe more accurately the longstanding nature of the proceedings, involving deliberation and decision-making following parliamentary procedure. Significant changes or additions adopted by the 2005 Congress delegates included a request to the School Bus Manufacturers Technical Council (SBMTC) to develop specifications for the fire-blocking performance of school bus chassis firewalls; clarification of the allowance for either black or yellow trim coloration on school bus bodies; augmentation of the recently updated Federal Motor Vehicle Safety Standard 217 (Bus Emergency Exits and Windows Retention and Release) to include additional roof hatches; accommodation of the new multifunction school activity bus sub-category of school buses; a recommendation to require “high-back” passenger seats in all large school buses as a further improvement to school bus passenger crash protection; a recommendation to require noise-canceling switches for use by school bus operators during railroad crossings; a recommendation, based on research findings, to prohibit the installation of two-point lap belts in large school buses, except to secure child safety restraint systems; elimination of requirements that were duplicative of recent federal and Society of Automotive Engineers (SAE) standards for specially equipped school buses; new operational procedures calling for reduced school bus engine idling, use of two-way communications systems, and required post-trip checks of buses by drivers for unattended children; the addition of new sections on School Transportation Security and School Activity Transportation; and updating the sections “Transportation for Students with Disabilities and Special Health Care Needs” and “Infants, Toddlers, and Pre-school Children” to conform to recent federal reauthorizations.



Innovations in School Transportation,” was adopted. Unlike action taken in previous congresses, there were no resolutions.

Like the 2005 Congress, the structure for the 2010 Congress and its operating guidelines were carried out by the Steering Committee. Funding for the Congress was shared solely by each individual participant of the Steering Committee, the writing committees and all delegates at the congress.

For the 2015 Congress, the steering committee recognized an opportunity to celebrate the achievement of over 75 years of existence, and an awards banquet was added to celebrate significant contributions to the success of NCST. The University of Central Missouri (UCM) and the Missouri Safety Center were recognized for 34 years of partnership to host NCST. Other significant contributions were also recognized.

Due to changes in economic conditions, and other factors, the partnership with UCM was unable to continue. New ways of facilitating NCST were identified by the steering committee. This resulted in National Association of State Directors of Pupil Transportation Services (NASDPTS) accepting responsibility for the NCST website as well as managing the budget and funding. NASDPTS also facilitated a request for proposals process that resulted in the selection of the Airport Holiday Inn located in Des Moines, Iowa, as the site for the 16<sup>th</sup> NCST. Some noted advantages for this site include the close proximity to the airport, a large offering of rooms on-site, and a large room for facilitating the congress proceedings. This change also permitted adding an awards banquet to celebrate significant contributions to the success of NCST.

These changes also shifted the responsibility for congress document preparation as well as the editing and publishing of the final document to the steering committee. New processes were put in place including professional formatting services to bring more uniformity to the document. In addition, a new product was created to show the changes that were made by the congress in color-edit format. This was welcomed by states and others who like to keep up on changes made during congress every five years.

In the fall of 2014, NCST lost a member of the Steering Committee with the passing of Don Carnahan. Don was a two-time former NCST Chair and active steering committee member for many years. Those involved with NCST felt his loss, and a special tribute was a part of the 16<sup>th</sup> NCST. National Association for Pupil Transportation (NAPT) was careful in selecting former state director from California, Ron Kinney as a new representative from NAPT. Ron joined the steering committee in early January and contributed much.

Changes made during the congress include: Interim Inquires and Amendments Requests processes to keep the steering committee and other committees in place with vacancies filled as needed so committees are able to respond during the interim. Significant changes were made to the School Bus Inspection section, as well as to the Operations section. Under Security and Emergency Preparedness, the Transportation Security Administration provided the congress with updates.

## **ABOUT THIS DOCUMENT**

Certain objectives and guiding principles have a vital role in the development of the specifications for school buses and procedures for their operation. These objectives and guiding principles have been reaffirmed and emphasized at the National Congresses (formerly Conferences) since 1939. The major objectives, safety, security and efficiency, along with the guiding principles stated herein, have served as guideposts for making decisions regarding the specifications and procedures and in arriving at sound and common agreement.

Adequate state and federal regulations governing school bus specifications and operations provide the key ingredients for the safe, secure and efficient transportation of students. Safety and security include all factors relating to school bus equipment, performance specifications and operational procedures that may directly or indirectly affect the safety, security and welfare of students transported. Efficiency includes the management of specifications, procurement and maintenance of school buses, the operational practices and procedures of staff consistent with the safety and welfare of students and the effective use of financial resources.

### **GUIDING PRINCIPLES**

- A. Federal standards and state specifications for school buses and procedures for their operation should:
  - 1. Be consistent with the objectives of safety, security and efficiency;
  - 2. Ensure the construction and use of safe buses;
  - 3. Reduce conflicting specifications and procedures among states, wherever possible; and
  - 4. Specify exact dimensions, where necessary, to increase the quality and efficiency of manufacture.
  
- B. Any adaptation of these national specifications and procedures should be made by states only in order to adjust to local needs and only when such adaptations do not...
  - 1. Conflict with Federal Motor Vehicle Safety Standards (FMVSSs);
  - 2. Conflict with the National Highway Traffic Safety Administration's Highway Safety Guideline #17 - Pupil Transportation Safety; and
  - 3. Unduly increase operation or production costs.

this document to define the recommended applicability within states or local providers adopting these specifications and procedures:

- A. **SHALL:** a mandatory condition. Where certain school bus designs, equipment or operations are described with the *shall* stipulation, it is *mandatory* that all school buses and all school bus operations meet those requirements, as written.

**Note:** The word *shall* also is used when referring to items that are already adopted into federal laws, standards or regulations.

- B. **SHOULD:** an advisory condition. Where certain school bus designs, equipment or operations are described with the word *should*, such items are considered to be advisable usage. In other words, the item is *recommended*, but not mandatory, for all school buses or all school bus operations.
- C. **MAY:** a permissive condition. Where certain school bus designs, equipment or operations are described with the word *may*, such items are considered for *possible* usage. However, there is no intent that the item be required for all school buses or all school bus operations.

Recognizing that many of these specifications and procedures (those using the above definition of *shall*) are recommended as requirements and will become requirements when they are adopted into regulations by individual states, Head Start agencies or local transportation providers, the principles and guidelines for the intended use of this report are consistent with the following “Statement of Understanding” adopted by the Steering Committee of the 14<sup>th</sup> National Congress on School Transportation and reaffirmed by the Steering Committee of the 15<sup>th</sup> Congress for inclusion herein. **In the context of this overall report, the following statement reminds persons using the report that until these specifications and procedures are adopted into state regulations, either by reference or directly, adherence to their provisions is voluntary:**

The purpose of this publication is to serve as a basis for the separate states to establish specifications, rules and/or regulations for school transportation within those states. This publication is representative of the consensus of professional practitioners from the states represented at the National Congress on School Transportation. Its emphasis on practices, procedures and performance encompasses school transportation in total and includes guidelines for school buses and school bus operations. The material contained herein will provide useful guidance for school transportation specialists in each state; however, it does not establish specifications or standards for any state. **Use of this publication in part or in its entirety is completely voluntary.**

The vehicle specifications contained herein are intended to apply primarily to **new** vehicles, including all types of school buses, as defined in APPENDIX H: GLOSSARY OF TERMS AND DEFINITIONS, under *Bus, School Bus*, which lists the various types of “school buses.” It should be noted that vehicles with a

## **INTERPRETATIONS AND INFORMATION**

Requests for interpretation of the 2015 specifications and procedures document shall be sent to the Steering Committee Chairman listed at [www.ncstonline.org](http://www.ncstonline.org). Interested parties are encouraged to visit the website for the most current information on all aspects of the 2015 16<sup>th</sup> NCST, the 17<sup>th</sup> NCST, and for any published interpretations to the 2015 *National School Transportation Specifications and Procedures*.

## **INTERIM INQUIRIES AND AMENDMENT REQUESTS**

The Interim Steering Committee acts on behalf of the Congress between congresses. Inquiries, requests for modifications and/or amendments of the specifications and procedures document shall be directed to the chairman of the Steering Committee. Contact the Steering Committee Chair as listed at [www.ncstonline.org](http://www.ncstonline.org).

The Steering Committee and/or Interim Steering Committee shall develop policies and procedures to implement the “Interim Inquiries and Amendment” process. The “Interim Inquiries and Amendment” process is outlined in the 17<sup>th</sup> NCST Manual of Operating Procedures (MOP), and Appendix I of the 2015 National School Transportation Specifications and Procedures document.

The Steering Committee will remain in place and will meet a minimum of annually during the NASDPTS/NAPT conference time frame. If vacancies occur in the steering committee, the sponsoring organization will fill these vacancies in a timely manner according to the MOP.

Writing committee chairs shall remain in place as directed by the Steering Committee. The Steering Committee shall consider the needs of each of the various committees, and the ability of the writing committee chairs to provide a continuation of those needs.

If a writing committee chair is unable to continue in the performance of assigned duties, they will notify the assigned coordinator with a copy to the NCST Chair. Writing committee chairs should make recommendations to their coordinators for possible replacements. The coordinator will make recommendations to the Steering Committee through the Steering Committee Chair.

Writing committee chairs will maintain a current listing of persons who are still able to serve on their committees. As vacancies occur, writing committee chairs shall report committee vacancies to their coordinator and discuss possible replacements with them.

**CHRONICLING  
INNOVATIONS  
IN SCHOOL  
TRANSPORTATION**

## **CHRONICLING INNOVATIONS IN SCHOOL TRANSPORTATION**

The Chronicling Innovations in School Bus Technology Committee recommended to the 16<sup>th</sup> NCST Interim Steering Committee that this section be removed from the National School Transportation Specifications and Procedures Manual.

This was not a hasty decision for the Steering Committee. After much debate and discussion, we acknowledge the importance of cost effective innovations in school bus technology for keeping our students safe while riding the yellow school bus. Since the 2010 National Congress, we did receive one submission for the 2015 National Congress on School Transportation from a vendor on behalf of a product. The conclusion was not all states would adopt or require adoption of “any” innovations that might be included in the manual. It would be up to the Committee to decide which innovations were worthy of inclusion and which ones were not. This could be deemed as preferential treatment of one vendor while excluding or alienating another. This could also be seen as an endorsement or implied endorsement of one technology and not another. The Steering Committee recognizes the value of the relationships we have with our vendors and suppliers throughout the Yellow School Bus Industry and would not want an idea of favoritism to become a perceived reality.

In moving forward, the Steering Committee encourages vetting of cost effective innovations throughout the school bus industry. The steering committee also recognizes the important role of media outlets in assisting the industry in vetting innovations within the industry and telling the school bus story.

In summary, concerning the balance needed in vetting cost effective innovations, the 16<sup>th</sup> National Congress on School Transportation Steering Committee quotes from the original 1939 work in developing national uniformity as identified in the publication titled: “Minimum Standards for School Buses” on page 5:

“The cost of pupil transportation may be considered as an addition to the ordinary cost of a satisfactory school program and in that sense it can be considered as a deduction from the total funds that might be available for superior school plant facilities and instructional programs. In view of this situation it is highly desirable that all possible economies consistent with pupil safety be attained and practiced in the construction and operation of school buses.”

# **BUS BODY AND CHASSIS SPECIFICATIONS**

## **BUS BODY AND CHASSIS SPECIFICATIONS**

### **AIR CLEANER**

- A. A dry element air cleaner shall be provided.
- B. All diesel engine air filters shall include a latch-type restriction indicator that retains the maximum restriction developed during operation of the engine. The indicator should include a reset control so the indicator can be returned to zero when desired.

### **AISLE**

All emergency exit doors shall be accessible by a 12-inch minimum aisle. The aisle shall be unobstructed at all times by any type of barrier, seat, wheelchair or tie-down, unless a flip seat is installed and occupied. The track of a track seating system is exempt from this requirement. A flip seat in the unoccupied (up) position shall not obstruct the 12-inch minimum aisle to any side emergency exit door.

### **AXLES**

The front and rear axle and suspension systems shall have a gross axle weight rating (GAWR) at ground commensurate with the respective front and rear weight loads of the bus loaded to the rated passenger capacity.

### **BACK-UP WARNING ALARM**

An automatic audible alarm shall be installed behind the rear axle and shall comply with the published Backup Alarm Standards (SAE J994b), providing a minimum of 112 dBA, or shall have a variable volume feature that allows the alarm to vary from 87 dBA to 112 dBA sound level, staying at least 5 dBA above the ambient noise level.

### **BRAKES: GENERAL**

- A. The chassis brake system shall conform to the provisions of FMVSS Nos. 105, Hydraulic and Electric Brake Systems, 106, Brake Hoses, and 121, Air Brake Systems, as applicable. All buses shall have either a parking pawl in the transmission or a park brake interlock that requires the service brake to be applied to allow release of the parking brake.
- B. The anti-lock brake system (ABS), provided in accordance with FMVSS No. 105, Hydraulic and Electric Brake Systems or No. 121, Air Brake Systems, shall provide wheel speed sensors for each front wheel and for each wheel on at least one rear axle. The system shall provide anti-lock braking performance for each wheel equipped with sensors (Four Channel System).



## **BUMPER: FRONT**

- A. School buses shall be equipped with a front bumper.
- B. The front bumper on buses of Type A-2 (with GVWR greater than 14,500 pounds), Type B, Type C, and Type D shall be equivalent in strength and durability to pressed steel channel at least  $\frac{3}{16}$  inches thick and not less than 8 inches wide (high). It shall extend beyond the forward-most part of the body, grille, hood and fenders and shall extend to the outer edges of the fenders at the bumper's top line. Type A buses having a GVWR of 14,500 pounds or less may be equipped with an OEM-supplied front bumper. The front bumper shall be of sufficient strength to permit being pushed by another vehicle on a smooth surface with a 5 degree, (8.7 percent) grade, without permanent distortion. The contact point on the front bumper is intended to be between the frame rails, with as wide a contact area as possible. If the front bumper is used for lifting, the contact points shall be under the bumper attachments to the frame rail brackets unless the manufacturer specifies different lifting points in the owner's manual. Contact and lifting pressures should be applied simultaneously at both lifting points.
- C. The front bumper, except breakaway bumper ends, shall be of sufficient strength to permit pushing a vehicle of equal gross vehicle weight, per Section B, without permanent distortion to the bumper, chassis or body.
- D. The bumper shall be designed or reinforced so that it will not deform when the bus is lifted by a chain that is passed under the bumper (or through the bumper if holes are provided for this purpose) and attached to both tow hooks/eyes. For the purpose of meeting this specification, the bus shall be empty and positioned on a level, hard surface, and both tow hooks/eyes shall share the load equally.

## **BUMPER: REAR**

- A. The bumper on Type A-1 buses shall be a minimum of 8 inches wide (high). Bumpers on Types A-2, B, C and D buses shall be a minimum of 9 ½ inches wide (high). The bumper shall be of sufficient strength to permit being pushed by another vehicle of similar size and being lifted by the bumper without permanent distortion.
- B. The bumper shall wrap around the back corners of the bus. It shall extend forward at least 12 inches, measured from the rear-most point of the body at the floor line, and shall be mounted flush with the sides of the body or protected with an end panel.
- C. The bumper shall be attached to the chassis frame in such a manner that it may be removed. It shall be braced to resist deformation of the bumper resulting from impact from the rear or the side. It shall be designed to discourage hitching of rides by an individual.

The cylinder shall be placed as close as practical to the mid-point of the tested structure, spanning two internal vertical structural members. The cylinder shall be statically loaded to the required force of curb weight or 20,000 pounds, whichever is less, in a horizontal plane with the load applied from the exterior toward the interior of the test structure. When the minimum load has been applied, the penetration of the loading cylinder into the passenger compartment shall not exceed 10 inches from its original point of contact. There can be no separation of lapped panels or construction joints. Punctures, tears or breaks in the external panels are acceptable but are not permitted on any adjacent interior panel. Body companies shall certify compliance with this intrusion requirement, and include test results, as requested.

- B. Construction shall be reasonably dust-proof and watertight.

### **CROSSING CONTROL ARM**

- A. School buses may be equipped with a crossing control arm mounted on the right side of the front bumper. When opened, this arm shall extend in a line parallel to the body side and aligned with the right front wheel.
- B. All components of the crossing control arm and all connections shall be weatherproofed.
- C. The crossing control arm shall incorporate system connectors (electrical, vacuum or air) at the gate and shall be easily removable to allow for towing of the bus.
- D. The crossing control arm shall be constructed of non-corrodible or nonferrous material or shall be treated in accordance with the body sheet metal specification. (See BUS BODY AND CHASSIS SPECIFICATIONS, Metal Treatment.)
- E. There shall be no sharp edges or projections that could cause injury or be a hazard to students. The end of the arm shall be rounded.
- F. The crossing control arm shall extend a minimum of 70 inches (measured from the bumper at the arm assembly attachment point) when in the extended position. The crossing control arm shall not extend past the end of the bumper when in the stowed position.
- G. The crossing control arm shall extend simultaneously with the stop signal arm(s), activated by stop signal arm controls.
- H. An automatic recycling interrupt switch may be installed for temporarily disabling the crossing control arm.

- C. The entrance door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches.
- D. The entrance door shall be a split-type door and shall open outward.
- E. All entrance door glass shall be approved safety glass. The bottom of each lower glass panel shall be not more than 10 inches from the top surface of the bottom step. The top of each upper glass panel when viewed from the interior shall be not more than 3 inches below the interior door control cover or header pad.
- F. Vertical closing edges on entrance doors shall be equipped with flexible material.
- G. All door openings shall be equipped with padding at the top edge of the opening. Padding shall be at least three inches wide and one inch thick and extend the full width of the door opening.
- H. On power-operated entrance doors, the emergency release valve, switch or device to release the entrance door must be placed above or to the immediate left or immediate right of the entrance door and must be clearly labeled. The emergency release valve, switch or device shall work in the absence of power.

## **DRIVE SHAFT**

The drive shaft shall be protected by a metal guard or guards around the circumference of the drive shaft to reduce the possibility of its whipping through the floor or dropping to the ground, if broken.

## **ELECTRICAL SYSTEM**

- A. Battery
  - 1. The storage batteries shall have minimum cold cranking capacity rating (cold cranking amps) equal to the cranking current required for 30 seconds at 0 degrees Fahrenheit and a minimum reserve capacity rating of 120 minutes at 25 amps. Higher capacities may be required, depending upon optional equipment and local environmental conditions.
  - 2. The manufacturer shall securely attach the battery on a slide-out or swing-out tray in a closed, vented compartment in the body skirt or chassis frame so that the battery is accessible for convenient servicing from the outside. When in the stored position, the tray shall be retained by a securing mechanism capable of holding the tray [with battery(ies)] in position when subjected to a 5g load from any direction. The battery compartment door or cover, if separate from the tray, shall be hinged at the front or top. It shall be secured by a positive operated latching system or other type fastener. The door may

**C. Electrical Components**

Materials in all electrical components shall contain no mercury.

**D. Wiring, Chassis**

1. All wiring shall conform to current applicable recommended practices of the Society of Automotive Engineers (SAE). All wiring shall use color and at least one other method for identification. The other method shall be either a number code or name code, and each chassis shall be delivered with a wiring diagram that illustrates the wiring of the chassis.
2. The chassis manufacturer of an incomplete vehicle shall install a readily accessible terminal strip or connector on the body side of the cowl or in an accessible location in the engine compartment of vehicles designed without a cowl. The strip or connector shall contain the following terminals for the body connections:
  - a. Main 100-amp body circuit;
  - b. Tail lamps;
  - c. Right turn signal;
  - d. Left turn signal;
  - e. Stop lamps;
  - f. Back-up lamps; and
  - g. Instrument panel lamps (controlled by dimmer switch).
3. An appropriate identifying diagram (color plus a name or number code) for all chassis electrical circuits shall be provided to the body manufacturer for distribution to the end user.
4. Wiring for the headlamp system must be separate from the electronic controlled body solenoid/module.

**E. Wiring, Body**

1. All wiring shall conform to current applicable SAE recommended practices.
2. All wiring shall have an amperage capacity exceeding the design load by at least 25%. All wiring splices are to be accessible and noted as splices on the wiring diagram.

9. Any of the above combination circuits may be subdivided into additional independent circuits.
  10. Heaters and defrosters shall be wired on an independent circuit.
  11. Whenever possible, all other electrical functions (such as sanders and electric-type windshield wipers) shall be provided with independent and properly protected circuits.
  12. Each body circuit shall be coded by number or letter on a diagram of circuits and shall be attached to the body in a readily accessible location.
- F. Buses may be equipped with a 12-volt power port in the driver's area.
- G. There shall be a manual noise suppression switch installed in the control panel. The switch shall be labeled and alternately colored. This switch shall be an on/off type that deactivates body equipment that produces noise, including at least the AM/FM radio, heaters, air conditioners, fans and defrosters. This switch shall not deactivate safety systems, such as windshield wipers or lighting systems.
- H. The entire electrical system of the body shall be designed for the same voltage as the chassis on which the body is mounted.

## **EMERGENCY EQUIPMENT**

- A. Fire Extinguisher
1. The bus shall be equipped with at least one UL-approved pressurized, dry chemical fire extinguisher. The extinguisher shall be secured in a mounted bracket, located in the driver's compartment and readily accessible to the driver and passengers. A pressure gauge shall be mounted on the extinguisher and shall be easily read without moving the extinguisher from its mounted position.
  2. The fire extinguisher shall have a rating of 2-A:10-BC, or greater. The operating mechanism shall be secured with a type of seal that will not interfere with the use of the fire extinguisher.
- B. First Aid Kit
1. The bus shall have a removable, moisture-proof and dust-proof first aid kit in an accessible place in the driver's compartment. It shall be mounted and identified as a first aid kit. The location for the first aid kit shall be marked. Contents of the first aid kit shall be in compliance with state standards.

*Release*, applicable to that type of exit, regardless of whether or not that exit is required by FMVSS No. 217.

**B. Emergency Window Requirements**

1. The rear emergency window shall have a lifting assistance device that will aid in lifting and holding the rear emergency window open.
2. Side emergency exit windows, when installed, may be vertically hinged on the forward side of the window. No side emergency exit window will be located above a stop arm.

**C. Emergency Door Requirements**

1. The exposed area of the upper panel of emergency doors shall be a minimum of 400 square inches of approved safety glazing.
2. If installed, all other glass panels on emergency doors shall be approved safety glazing.
3. There shall be no steps leading to an emergency door.
4. There shall be no obstruction higher than  $\frac{1}{4}$  inch across the bottom of any emergency door opening. Fasteners used within the emergency exit opening shall be free of sharp edges or burrs.

**D. Emergency Exit Requirements:** The use of the following tables is to determine the required number and types of emergency exits to comply with this specification, based on the bus manufacturer's equipped seating capacity.

1. Use **Table 1** if the bus contains a rear emergency door, or
2. Use **Table 2** if the bus contains a rear pushout emergency window AND a left side emergency door, as required by FMVSS No. 217 for school buses without a rear emergency door.
3. When using either Table 1 or Table 2:
  - a. Enter the Table at the appropriate "CAPACITY" and select the desired row from the options for that capacity.
  - b. A school bus will meet the requirements of this specification and the requirements of FMVSS 217 if it contains the types and quantities of emergency exits listed on the row selected.

- G. For after treatment systems that require Diesel Exhaust Fluid (DEF) to meet federally mandated emissions:
  - 1. The composition of Diesel Exhaust Fluid (DEF) must comply with International Standard ISO 22241-1. Refer to engine manufacturer for any additional DEF requirements.
  - 2. The DEF supply tank shall be sized to meet a minimum ratio of 3 diesel fills to 1 DEF fill.

### **FENDERS: FRONT**

- A. When measured at the fender line, the total spread of the outer edges of front fenders shall exceed the total spread of front tires when front wheels are in a straight-ahead position.
- B. Front fenders shall be properly braced and shall not require attachment to any part of the body.

### **FIRE SUPPRESSION SYSTEMS (OPTIONAL)**

- A. The chassis manufacturer may provide an automatic fire extinguisher system in the engine compartment.
- B. Fire suppression system nozzles shall be located in the engine compartment, under the bus, in the electrical panel or under the dash, but they shall not be located in the passenger compartment. The system must include a lamp or buzzer to alert the driver that the system has been activated.

### **FLOORS**

- A. The floor in the under-seat area, including tops of wheel housings, driver's compartment and toeboard, shall be covered with an elastomer floor covering, having a minimum overall thickness of .125 inch and a calculated burn rate of 0.1 mm per minute or less, using the test methods, procedures and formulas listed in FMVSS No. 302, *Flammability of Interior Materials*. The driver's area and toeboard area in all Type-A buses may be manufacturer's standard flooring and floor covering.
- B. The floor covering in the aisles shall be ribbed or other raised pattern elastomer and have a calculated burn rate of 0.1 mm per minute or less using the test methods, procedures and formulas listed in FMVSS No. 302. Minimum overall thickness shall be .187 inch measured from tops of ribs.

- F. Installation of Liquefied Petroleum Gas (LPG) tanks shall comply with National Fire Protection Association (NFPA) 58, *Liquefied Petroleum Gas Code*.
- G. Installation of Compressed Natural Gas (CNG) containers shall comply with FMVSS No. 304, *Compressed Natural Gas Fuel Container Integrity*.
- H. The CNG Fuel System shall comply with FMVSS No. 303, *Fuel System Integrity of Compressed Natural Gas Vehicles*.

## **GOVERNOR**

An electronic engine speed limiter shall be provided and set to limit engine speed, not to exceed the maximum revolutions per minute, as recommended by the engine manufacturer.

## **HANDRAILS**

At least one handrail shall be installed. The handrail shall be a minimum of 1" diameter and be constructed from corrosion resistant material(s). The handrail(s) shall assist passengers during entry or exit and shall be designed to prevent entanglement, as evidenced by the passing of the NHTSA string and nut test.

## **HEATING SYSTEM, PROVISION FOR**

The engine shall be capable of supplying coolant at a temperature of at least 170 degrees Fahrenheit at the engine coolant thermostat opening. The coolant flow rate shall be 50 pounds per minute at the return end of 30 feet of one inch inside diameter automotive hot water heater hose. (See SBMTC-001, *Standard Code for Testing and Rating Automotive Bus Hot Water Heating and Ventilating Equipment*.)

## **HEATING AND AIR CONDITIONING SYSTEMS**

- A. Heating System
  - 1. The heater shall be hot water combustion type, electric heating element or heat pump.
  - 2. If only one heater is used, it shall be fresh-air or combination fresh-air and recirculation type.
  - 3. If more than one heater is used, additional heaters may be re-circulating air type.
  - 4. The heating system shall be capable of maintaining bus interior temperatures, as specified in test procedure SAE J2233.



9. All heaters of hot water type in the passenger compartment shall be equipped with a device, installed in the hot water pressure line, which regulates the water flow to all passenger heaters. The device shall be conveniently operated by the driver while seated. The driver and passenger heaters may operate independently of each other for maximum comfort.
10. On hot water type systems, accessible bleeder valves for removing air from the heater shall be installed in an appropriate place in the return lines of body company-installed heater.
11. Access panels shall be provided to make heater motors, cores, elements and fans readily accessible for service. An exterior access panel to the driver's heater may be provided.

**B. Passenger Compartment Air Conditioning (Optional)**

The following specifications are applicable to all types of school buses that may be equipped with air conditioning. This section is divided into three parts. Part 1 covers performance specifications, Part 2 covers test conditions and Part 3 covers other requirements applicable to all buses.

**1. Performance Specifications**

**a. Standard Performance**

The installed air conditioning system should cool the interior of the bus from 100 degrees to 80 degrees Fahrenheit, measured at three points (minimum) located four feet above the floor on the longitudinal centerline of the bus. The three required points shall be: (1) three feet above the center point of the horizontal driver seat surface, (2) at the longitudinal midpoint of the body, and (3) three feet forward of the rear emergency door or, for Type D rear-engine buses, three feet forward of the end of the aisle. Note for the Type A vehicles placement of the rear thermocouple should be centered in the bus over the rear axle. The independent temperature reading of each temperature probe inside the bus shall be within a range of  $\pm 3$  degrees Fahrenheit of the average temperature at the conclusion of the test.

**b. High Performance**

The installed air conditioning system should cool the interior of the bus from 100 degrees to 70 degrees Fahrenheit, measured at three points (minimum) located four feet above the floor on the longitudinal centerline of the bus. The three required points shall be:

evaporator locations) of the passenger area on both sides of the bus interior;

- d. The body may be equipped with insulation, including sidewalls, roof, firewall, rear, inside body bows and plywood or composite floor insulation to reduce thermal transfer;
- e. All glass (windshield, service and emergency doors, side and rear windows) may be equipped with maximum integral tinting allowed by federal, state or ANSI standards for the respective locations, except that windows rear of the driver's compartment, if tinted, shall have approximately 28 percent light transmission;
- f. Electrical generating capacity shall be provided to accommodate the additional electrical demands imposed by the air conditioning system;
- g. Roofs may be painted white to aid in heat dissipation (See APPENDIX B); and
- h. Air intake for any evaporator assembly(ies), except for front evaporator of Type A-1, shall be equipped with replaceable air filter(s) accessible without disassembly of evaporator case.
- i. For all buses (except Type D rear engine transit) equipped with a rear evaporator assembly, evaporator shall not encroach upon head impact zone, but may occupy an area of less than 26.5 inches from the rear wall and 14 inches from the ceiling.
- j. For Type D rear engine transit buses equipped with a rear evaporator over the davenport, the evaporator assembly may not interfere with rear exit window and may not extend above the rear seating row.

## **HINGES**

All exterior metal door hinges shall be designed to allow lubrication to be channeled to the center 75% of each hinge loop without disassembly, unless they are constructed of stainless steel, brass or non-metallic hinge pins or other designs that prevent corrosion.

## **HORN**

The bus shall be equipped with a horn(s) of standard make with the horn(s) capable of producing a complex sound in bands of audio frequencies between 250 and 2,000 cycles per second, and tested in accordance with SAE J377, *Horn—Forward Warning— Electric— Performance, Test, and Application*.

of Type A-1 buses shall be 62 inches or more. Inside height measurement does not apply to air conditioning equipment.

## **INSTRUMENTS AND INSTRUMENT PANEL**

A. The chassis shall be equipped with the instruments and gauges listed below:

**Note:** Telltale warning lamps in lieu of gauges are not acceptable, except as noted.

1. Speedometer;
2. Odometer that can be read without using a key and that will give accrued mileage (to seven digits), including tenths of miles, unless tenths of miles are registered on a trip odometer;

3. Tachometer;

**Note:** For types B, C and D buses, a tachometer shall be installed so as to be visible to the driver while seated in a normal driving position.

4. Voltmeter;

**Note:** An ammeter with graduated charge and discharge indications is permitted in lieu of a voltmeter; however, when used, the ammeter wiring must be compatible with the current flow of the system.

5. Oil pressure gauge;
6. Water temperature gauge;
7. Fuel gauge;
8. High beam headlamp indicator;
9. Brake air pressure gauge (air brakes), brake indicator lamp (vacuum/hydraulic brakes), or brake indicator lamp (hydraulic/hydraulic);
10. Turn signal indicator; and
11. Glow-plug indicator lamp, where appropriate.

B. All instruments shall be easily accessible for maintenance and repair.

C. The instruments and gauges shall be mounted on the instrument panel so that each is clearly visible to the driver while seated in a normal driving position.

- B. Interior overhead storage compartments may be provided if they meet the following criteria:
  - 1. Head protection requirements of FMVSS No. 222, *School Bus Passenger Seating and Crash Protection*, where applicable;
  - 2. Be completely enclosed and equipped with latching door (both door and latch sufficient to withstand a pushing force of 50 pounds applied at the inside center of the door);
  - 3. Have all corners and edges rounded with a minimum radius of one inch or be padded equivalent to door header padding;
  - 4. Be attached to the bus sufficiently to withstand a force equal to 20 times the maximum rated capacity of the compartment; and
  - 5. Have no protrusions greater than ¼ inch.
- C. The driver's area forward of the foremost padded barriers will permit the mounting of required safety equipment and vehicle operation equipment.
- D. Every school bus shall be constructed so that the noise level at the ear of the occupant nearest to the primary vehicle noise source shall not exceed 85 dBA when tested according to the procedure described in APPENDIX B.

## **LAMPS AND SIGNALS**

- A. Interior lamps which illuminate the aisle and the stepwell shall be provided. The stepwell lamp shall be illuminated by an entrance door-operated switch, to illuminate only when headlamps and clearance lamps are on and the entrance door is open.
- B. Body instrument panel lamps may be controlled by an independent dimmer switch or may be controlled by the dimmer that operates the gauge lighting.
- C. School bus alternately flashing signal lamps shall be provided, as described by law. MFSABs are exempt from this requirement.
  - 1. The bus shall be equipped with two red lamps at the rear of the vehicle and two red lamps at the front of the vehicle.
  - 2. In addition to the four red lamps described above, four amber lamps shall be installed so that one amber lamp is located near each red signal lamp, at the same level, but closer to the vertical centerline of the bus. The system of red and amber signal lamps shall be wired so that amber lamps are energized manually. The red lamps are automatically energized and amber lamps are

illuminated area shall be mounted on the rear of the bus just inside the turn signal lamps

- b. Two combination lamps with a minimum diameter of four inches, or if a shape other than round, a minimum of 12 square inches of illuminated area, shall be placed on the rear of the body between the beltline and the floor line. The rear license plate lamp may be combined with one lower tail lamp. Stop lamps shall be activated by the service brakes and shall emit a steady light when illuminated.
- E. On buses equipped with a monitor for the front and rear lamps of the school bus, the monitor shall be mounted in full view of the driver. If the full circuit current passes through the monitor, each circuit shall be protected against any short circuit or intermittent shorts by a fuse circuit breaker, or electronic protection device.
- F. An optional white flashing strobe lamp may be installed on the roof of a school bus at a location not closer than 12 inches or more than 6 feet from the rear of the roof edge. However, if the bus is equipped with a roof hatch or other roof mounted equipment falling within the above mentioned measurements, the strobe lamp may be located directly behind that equipment. The lamp shall have a single clear lens emitting light 360 degrees around its vertical axis, meeting the requirements of SAE J845. It may not extend above the roof more than the maximum legal height. A manual switch and a pilot lamp shall be included to indicate when the lamp is in operation. Optionally, the strobe lamp may be wired to activate with the amber alternately flashing signal lamps, continuing through the full loading or unloading cycle, and may be equipped with an override switch to allow activation of the strobe at any time for use in inclement weather.
- G. The bus body shall be equipped with two white rear backup lamps that are at least four inches in diameter or, if a shape other than round, a minimum of 12 square inches of illuminated area, and shall meet FMVSS No. 108. If backup lamps are placed on the same horizontal line as the brake lamps and turn signal lamps, they shall be to the inside.
- H. A daytime running lamps (DRL) system shall be provided.

## **METAL TREATMENT**

- A. All metal except high-grade stainless steel or aluminum used in construction of the bus body shall be zinc-coated or aluminum-coated or treated to prevent corrosion. This includes but is not limited to such items as structural members, inside and outside panels, door panels and floor sills. Excluded are such items as door handles, grab handles, interior decorative parts and other interior plated parts.

## **OIL FILTER**

An oil filter with a replaceable element shall be provided and connected by flexible oil lines if it is not a built-in or an engine-mounted design. The oil filter shall have a capacity in accordance with the engine manufacturer's recommendation.

## **OPENINGS**

All openings in the floorboard or firewall between the chassis and the passenger compartment (e.g., for gearshift selector and parking brakes lever) shall be sealed.

## **OVERALL LENGTH**

Overall length of the bus shall not exceed 45 feet, excluding accessories.

## **OVERALL WIDTH**

Overall width of bus shall not exceed 102 inches, excluding accessories.

## **PASSENGER LOAD**

- A. Actual gross vehicle weight (GVW) is the sum of the chassis weight plus the body weight, plus the driver's weight, plus total seated student weight. For purposes of calculation, the driver's weight is 150 pounds and the student weight is 120 pounds per student.
- B. Actual GVW shall not exceed the chassis manufacturer's GVWR for the chassis, nor shall the actual weight carried on any axle exceed the chassis manufacturer's Gross Axle Weight Rating (GAWR).

## **PUBLIC ADDRESS SYSTEM**

- A. Buses may be equipped with an AM/FM/audio and/or public address system having interior and exterior speakers.
- B. No internal speakers, other than the driver's communication systems, may be installed within four feet of the driver's seat back in its rearmost upright position.

## **RETARDER SYSTEM (OPTIONAL EQUIPMENT)**

A retarder system, if used, shall limit the speed of a fully loaded school bus to 19.0 mph on a 7% grade for 3.6 miles.

## **RETROREFLECTIVE MATERIAL**

(See also APPENDICES A and B, Retroreflective Sheeting.)

- A. The front and/or rear bumper may be marked diagonally 45 degrees down toward

except at the wheel housing, and it shall extend only to the longitudinal tangent of the right and left rear corners.

- C. Rub rails above the floor line shall be attached at each body post and at all other upright structural members.
- D. Each rub rail shall be four inches or more in width in its finished form and shall be constructed of 16-gauge metal or other material of equivalent strength suitable to help protect body side panels from damage. Rub rails shall be constructed in corrugated or ribbed fashion.
- E. Rub rails shall be applied outside the body or outside the body posts. (Pressed-in or snap-on rub rails do not satisfy this requirement.) For Type A-1 vehicles using the body provided by the chassis manufacturer or for Types A-2, B, C and D buses containing the rear luggage or the rear engine compartment, rub rails need not extend around the rear corners.
- F. The bottom edge of the body side skirts shall be stiffened by application of a rub rail, or the edge may be stiffened by providing a flange or other stiffeners.

## **SEATS AND RESTRAINING BARRIERS**

- A. Passenger Seating
  - 1. School bus design capacities shall be in accordance with 49 CFR, Part 571.3, *Definitions*, and FMVSS No. 222, *School Bus Passenger Seating and Crash Protection*.
  - 2. All seats shall have a minimum cushion depth of 15 inches, a seat back height of 24 inches above the seating reference point, and must comply with all other requirements of FMVSS No. 222.
  - 3. All restraining barriers and passenger seats shall be constructed with materials that enable them to meet the criteria of the *School Bus Seat Upholstery Fire Block Test*.
  - 4. Each seat leg shall be secured to the floor by bolts, washers and nuts in order to meet the performance requirements of FMVSS No. 222. Flange-head nuts may be used in lieu of nuts and washers. All seat frames attached to the seat rail shall be fastened with two or more bolts, washers and nuts, or with flange-head nuts. Seats may be track-mounted in conformance with FMVSS No. 222.
  - 5. If track seating is installed, the manufacturer shall supply minimum and maximum seat spacing dimensions (applicable to the bus) which comply with

A Type 2 lap/shoulder belt shall be provided for the driver. On buses where the driver's seat and upper anchorage for the shoulder belt are both attached to the body structure, a driver's seat with an integrated Type 2 lap/shoulder belt may be substituted. On buses where the driver's seat and upper anchorage for the shoulder belt are separately attached to both body and chassis structures (i.e., one attached to the chassis and the other attached to the body), a driver's seat with an integrated Type 2 lap/shoulder belt should be used.

The assembly shall be equipped with an emergency locking retractor for the continuous belt system. On all buses except Type A that are equipped with a standard chassis manufacturer's driver's seat, the lap portion of the belt system shall be guided or anchored to prevent the driver from sliding sideways under the belt system. The lap/shoulder belt shall be designed to allow for easy adjustment in order to fit properly and to effectively protect drivers varying in size from 5th percentile adult female to 95th percentile adult male. The belt may be of a high visibility contrasting color.

- E. Each bus shall be equipped with a durable webbing cutter having a full width handgrip and a protected, replaceable or non-corrodible blade. The required webbing cutter shall be mounted in a location accessible to the seated driver in an easily detachable manner.

## **SHOCK ABSORBERS**

The bus shall be equipped with double-action shock absorbers compatible with the manufacturer's rated axle capacity at each wheel location.

## **SIDE SKIRTS**

School bus body side skirts between the front and rear axles shall extend down to within two inches plus or minus, of the horizontal line from the center of the front spindle to the center of the rear axle. The manufacturer may offer optional side skirt lengths that extend lower than this requirement. This measurement shall apply to a new unloaded school bus located on a flat, level surface.

## **STEERING GEAR**

- A. The steering gear shall be approved by the chassis manufacturer and designed to ensure safe and accurate performance when the vehicle is operated with maximum load and at maximum speed.
- B. If external adjustments are required, the steering mechanism shall be accessible to make adjustments.



*Resistance of Organic Coatings by the Taber Abraser, (CS-17 Wheel, 1000 gram, 1000 cycle).*

2. Weathering resistance: Step treads shall not break, crack, or check after ozone exposure (seven days at 50 pphm at 40 degrees C) and Weatherometer exposure (ASTM D-750, *Standard Test Method for Rubber Deterioration in Carbon-Arc Weathering Apparatus*, seven days).
3. Flame resistance: Step treads shall have a calculated burn rate of .01 mm per minute or less using the test methods, procedures and formulas listed in FMVSS No. 302, *Flammability of Interior Materials*.

Note: A spray on application type material may be used in lieu of item A. that meets the requirements of items B. through D. The material shall be applied not only to the interior surfaces of the service door step treads but also to the exterior, if not covered by undercoating.

## **STIRRUP STEPS**

If the windshield and lamps are not easily accessible from the ground, there may be at least one folding stirrup step or recessed foothold installed on each side of the front of the body for easy accessibility for cleaning. There also may be a grab handle installed in conjunction with the step. Steps are permitted in or on the front bumper in lieu of the stirrup steps if the windshield and lamps are easily accessible for cleaning from that position.

## **STOP SIGNAL ARM**

The stop signal arm(s) shall comply with the requirements of FMVSS No. 131, *School Bus Pedestrian Safety Devices*. MFSABs are exempt from these requirements.

## **STORAGE COMPARTMENT (OPTIONAL)**

A storage container for tools, tire chains and/or other equipment may be located either inside or outside the passenger compartment. If inside, it shall be fastened to the floor and have a cover with a positive fastening device.

## **SUN SHIELD**

- A. On Types B, C and D vehicles, an interior adjustable transparent sun shield, with a finished edge and dimensions not less than 6x30 inches, shall be installed in a position convenient for use by the driver.
- B. On Type A buses, the sun shield (visor) shall be installed by the chassis manufacturer.

pulling, angularity applied to the tow hooks will decrease the capacities of the tow hooks.

- C. The towing devices shall be mounted such that they do not project forward of the front bumper or rearward of the rear bumper.

**Note:** Type A buses are exempt from the requirement for front tow hooks or eyes due to built-in crush zones.

## **TRACTION ASSISTING DEVICES (OPTIONAL)**

- A. Where required or used, sanders shall:
  - 1. Be hopper cartridge-valve type;
  - 2. Have a metal hopper with all interior surfaces treated to prevent condensation of moisture;
  - 3. Have at least 100 pounds (grit) capacity;
  - 4. Have a cover that screws in place on the filler opening of the hopper, thereby sealing the unit airtight;
  - 5. Have discharge tubes extending under the fender wheelhousing to the front of each rear wheel;
  - 6. Have non-clogging discharge tubes with slush-proof, non-freezing rubber nozzles;
  - 7. Be operated by an electric switch with a pilot lamp mounted on the instrument panel located so as to be exclusively controlled by the driver;
  - 8. Be equipped with a gauge to indicate that the hopper has reached the one-quarter level (and needs to be refilled); and
  - 9. Be designed to prevent freezing of all activation components and moving parts.
- B. Automatic traction chains may be installed.

## **TRANSMISSION**

- A. Automatic transmissions shall have no fewer than three forward speeds and one reverse speed. Mechanical shift selectors shall provide a detent between each gear position when the gear selector quadrant and shift selector are not steering-column mounted.

- C. The bus body shall be equipped with a suitably controlled ventilating system with capacity sufficient to maintain the proper quantity of air flow under operating conditions without having to open a window except in extremely warm weather.
- D. Static-type, non-closeable exhaust ventilation shall be installed in a low-pressure area of the roof.
- E. Roof hatches designed to provide ventilation in all types of exterior weather conditions may be provided.

## **WHEELHOUSING**

- A. The wheelhousing opening shall allow for easy tire removal and service.
- B. Wheel housings shall be attached to the floor panels in a manner to prevent any dust, water or fumes from entering the body. Wheel housings shall be constructed of 16-gauge (or thicker) steel.
- C. The inside height of the wheel housings above the floor line shall not exceed 12 inches.
- D. The wheel housings shall provide clearance for installation and use of tire chains on single or dual (if so equipped) power-driving wheels.
- E. No part of a raised wheelhousing shall extend into the emergency door opening.

## **WINDOWS**

- A. Other than emergency exits designated to comply with FMVSS No. 217, *Bus Emergency Exits and Window Retention and Release*, each side window shall provide an unobstructed opening of at least nine inches high (but not more than 13 inches high) and at least 22 inches wide, obtained by lowering the window. One window on each side of the bus may be less than 22 inches wide.
- B. Optional tinted and/or frost-free glazing may be installed in all doors or windows.
- C. Windshields shall comply with federal, state and local regulations.

## **WINDSHIELD WASHERS**

A windshield washer system shall be provided.

**SPECIALLY  
EQUIPPED  
SCHOOL BUS  
SPECIFICATIONS**

# SPECIALLY EQUIPPED SCHOOL BUS SPECIFICATIONS

## INTRODUCTION

The specifications in this section are intended to supplement specifications in the BODY AND CHASSIS section. In general, specially equipped buses shall meet all the requirements of the preceding sections, plus those listed in this section. It is recognized that the field of special transportation is characterized by varied needs for individual cases and by rapidly emerging technologies for meeting individual student needs. A flexible, "common sense" approach to the adoption and enforcement of specifications for these vehicles, therefore, is prudent.

## DEFINITION

A *specially equipped school bus* is any school bus that is designed, equipped and/or modified to accommodate students with special transportation needs.

## GENERAL REQUIREMENTS

- A. Specially equipped school buses shall comply with the *National School Transportation Specifications and Procedures* and with the Federal Motor Vehicle Safety Standards (FMVSSs) applicable to their Gross Vehicle Weight Rating (GVWR) category.
- B. Any school bus to be used for the transportation of children who utilize a wheelchair or other mobile positioning device, or who require life-support equipment that prohibits use of the regular service entrance, shall be equipped with a power lift.

## AISLES

All school buses equipped with a power lift shall provide a minimum 30-inch pathway leading from any wheelchair position to at least one 30 inches wide emergency exit door. A wheelchair securement position shall never be located directly in front of (blocking) a power lift door location.

## GLAZING

Tinted glazing may be installed in all doors, windows and windshields consistent with federal, state and local regulations.

## IDENTIFICATION

Specially equipped school buses shall display the International Symbol of Accessibility below the window line. Such emblems shall be white on blue or black background, shall not exceed 12 inches square in size and shall be of a high-intensity retroreflective material meeting the requirements of Federal Highway Administration (FHWA) FP-85, *Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects*.

**Boarding direction:** The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.

**Handrails:** (See 49 CFR 571.403, S6.4.9, *Handrails*.)

**Circuit breaker:** A resettable circuit breaker shall be installed between the power source and the lift motor if electrical power is used. It shall be located as close to the power source as possible, but not within the passenger/driver compartment.

**Excessive pressure:** (See 49 CFR 571.403, S6.8, *Jacking prevention*.)

**Documentation:** The following information shall be provided with each vehicle equipped with a lift:

A phone number where information can be obtained about installation, repair and parts. (Detailed written instructions and a parts list shall be available upon request.)

Detailed instructions regarding use of the lift shall be readily visible when the lift door is open, including a diagram showing the proper placement and positioning of wheelchair/mobility aids on the lift.

**Training materials:** The lift manufacturer shall make training materials available to ensure the proper use and maintenance of the lift. These may include instructional videos, classroom curriculum, system test results or other related materials.

**Identification and certification:** Each lift shall be permanently and legibly marked or shall incorporate a non-removable label or tag that states it conforms to all applicable requirements of the current *National School Transportation Specifications and Procedures*. In addition, and upon request of the original titled purchaser, the lift manufacturer or an authorized representative shall provide a notarized Certificate of Conformance, either original or photocopied, which states that the lift system meets all the applicable requirements of the current *National School Transportation Specifications and Procedures*.

- D. Child safety restraint systems, which are used to facilitate the transportation of children who in other modes of transportation would be required to use a child, infant or booster seat, shall conform to FMVSS No. 213.

## **SEATING ARRANGEMENTS**

Flexibility in seat spacing to accommodate special devices shall be permitted to meet passenger requirements. All seating shall meet the requirements of FMVSS No. 222, *School Bus Passenger Seating and Crash Protection*.

## **SECUREMENT AND RESTRAINT SYSTEM FOR WHEELCHAIRS AND WHEELCHAIR-SEATED OCCUPANTS**

For purposes of understanding the various aspects and components of this section, the terms *securement* and *tie down* and the phrases *securement system* or *tie down system* are used exclusively in reference to the devices that anchor the wheelchair to the vehicle. The term *restraint* and the phrase *restraint system* are used exclusively in reference to the equipment that is intended to limit the movement of the wheelchair occupant in a crash or sudden maneuver. The term *wheelchair tie down and occupant restraint system (WTORS)* is used to refer to the total system that secures the wheelchair and restrains the wheelchair occupant.

### **A. WTORS — general requirements:**

1. A wheelchair tie down and occupant restraint system installed in specially equipped school buses shall be designed, installed, and operated for use with forward-facing wheelchair-seated passengers and shall comply with all applicable requirements of FMVSS 222, *School Bus Passenger Seating and Crash Protection*, and SAE J2249, *Wheelchair Tie down and Occupant Restraint Systems for Use in Motor Vehicles*.
2. The WTORS, including the anchorage track, floor plates, pockets or other anchorages, shall be provided by the same manufacturer or shall be certified to be compatible by manufacturers of all equipment/systems used.
3. Wheelchair securement positions shall be located such that wheelchairs and their occupants do not block access to the lift door.
4. A device for storage of the WTORS shall be provided. When the system is not in use, the storage device shall allow for clean storage of the system, shall keep the system securely contained within the passenger compartment, shall provide reasonable protection from vandalism and shall enable the system to be readily accessed for use.
5. The WTORS, including the storage device, shall meet the flammability standards established in FMVSS No. 302, *Flammability of Interior Materials*.

**Note:** A special service entrance and door may be located on the left side of the bus only if the bus is used only to deliver students to the left side of one-way streets and its use is limited to that function.

- C. The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.
- D. A drip molding shall be installed above the special service entrance to effectively divert water from the entrance.
- E. Door posts and headers at the special service entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for the special service entrance.

## **SPECIAL SERVICE ENTRANCE DOORS**

- A. A single door or double doors may be used for the special service entrance.
- B. A single door shall be hinged to the forward side of the entrance unless this would obstruct the regular service entrance. If the door is hinged to the rearward side of the doorway, the door shall utilize a safety mechanism that will prevent the door from swinging open should the primary door latch fail. If double doors are used, the system shall be designed to prevent the door(s) from being blown open by the aerodynamic forces created by the forward motion of the bus, and/or shall incorporate a safety mechanism to provide secondary protection should the primary latching mechanism(s) fail.
- C. All doors shall have positive fastening devices to hold doors in the "open" position when the special service entrance is in use.
- D. All doors shall be weather sealed.
- E. When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward-mounted door shall have at least three one-point fastening devices. One shall be to the header, one to the floor line of the body, and the other shall be into the rear door. The door and hinge mechanism shall have strength that is greater than, or equivalent to, the strength of the emergency exit door.
- F. Door materials, panels and structural components shall have strength equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering and other exterior features shall match adjacent sections of the body.



as an emergency stretcher or drag. This evacuation device shall be properly secured to the bus in a location to be determined by the purchaser.

- D. If transporting oxygen, refer to AMD Standard 003.

## **TECHNOLOGY AND EQUIPMENT, NEW**

It is the intent of these specifications to accommodate new technologies and equipment that will better facilitate the transportation of students with special needs. New technology and equipment are acceptable for use in specially equipped vehicles if:

- A. Items do not compromise the effectiveness or integrity of any major safety system. (Examples of safety systems include, but are not limited to, compartmentalization, the eight-lamp warning system, emergency exits and the approved color scheme.)
- B. Items do not diminish the safety of the bus interior.
- C. Items do not create additional risk to students who are boarding or exiting the bus or are in or near the school bus loading zone.
- D. Items do not require undue additional activity and/or responsibility for the driver.
- E. Items generally increase efficiency and/or safety of the bus, generally provide for a safer or more pleasant experience for the occupants and pedestrians in the vicinity of the bus and/or generally assist the driver and makes his/her many tasks easier to perform.